

CLAIMS

- 1 1. A lithium battery powered LED light comprising:
2 a lithium battery power source;
3 a switch;
4 a Gallium Nitride Light Emitting Diode (LED) selectively electrically connected to
5 the lithium battery by the switch;
6 a heat sink thermally coupled to the LED;
7 a voltage converter and current regulator circuit having a circuit contact electrically
8 connected to the switch, the LED and the lithium battery constructed and arranged to provide
9 a predetermined voltage and current to the LED when connected to the lithium battery; and
10 a housing within which the lithium battery, the switch, the LED, the heat sink and the
11 voltage converter and current regulator circuit are located.
- 1 2. A lithium battery powered LED light in accordance with claim 1 wherein the housing
2 comprises a metal body comprising the heat sink.
- 1 3. A lithium battery powered LED light in accordance with claim 1 wherein the housing
2 includes a metal body having threaded parts comprising the switch, which is closed when the
3 threaded parts of the housing are screwed together in a first direction, thereby urging the
4 lithium battery against the circuit contact, causing activation of the voltage converter and
5 current regulator circuit and causing the LED to emit light.
- 1 4. A lithium battery powered LED light in accordance with claim 3 and further
2 comprising,
3 a compressed rubber ring configured to urge the battery away from the circuit contact
4 and deactivate the voltage converter and current regulator circuit when the threaded parts of
5 the housing are turned in a second direction opposed to the first direction.
- 1 5. A lithium battery powered LED light in accordance with claim 3 wherein the
2 threaded parts comprise outside-diameter threads and inside-diameter threads that are
3 moveably coupled to each other.

6. A lithium battery powered LED light in accordance with claim 1 wherein the lithium battery and the Gallium Nitride LED are constructed and arranged to have a shelf life of at least 10 years.

7. A lithium battery powered LED light in accordance with claim 1 and further comprising a collimator optically coupled to the LED.

8. A lithium battery powered LED light in accordance with claim 7 wherein the collimator comprises an optical-grade-acrylic-plastic.

9. A lithium battery powered LED light in accordance with claim 7 wherein the collimator is constructed and arranged to produce a substantially 10-degree light beam when the LED is on.

10. A light in accordance with claim 7 wherein the collimator is integrally coupled to the housing, thereby acting as a protective lens at a front end of the light to protect the LED and electronic components included within the housing.

11. A lithium battery powered LED light in accordance with claim 1 wherein the LED is constructed and arranged to emit light waves at a frequency that is seen by the human eye as blue/green or teal in color.

12. A lithium battery powered LED light in accordance with claim 1 wherein the LED has a brightness such that the LED can be seen from a distance of over 1 mile.

13. A lithium battery powered LED light in accordance with claim 1 wherein the voltage converter and current regulator circuit is constructed and arranged to provide at least 85% power efficiency.

14. A lithium battery powered LED light in accordance with claim 1 wherein the LED is permanently mounted on a metal circuit board holder comprising,
a thermally conductive path thermally coupled to the LED and a metal body of the housing.

1 15. A lithium battery powered LED light in accordance with claim 14 wherein the metal
2 circuit board holder comprises a first passage, the lithium battery powered LED light further
3 comprising:

4 a one-sided circuit board including a second passage aligned with the first
5 passage;

6 a connecting wire passing through the first and second passages, the
7 connecting wire electrically connected to the circuit board and to a contact for the lithium
8 battery; and

9 a cavity defined by the housing within which portions of the connecting wire
10 are stored.

1 16. A lithium battery powered LED light in accordance with claim 1 wherein the housing
2 comprises polished metal in the form of a column.

1 17. A lithium battery powered LED light in accordance with claim 16 wherein the
2 housing does not include any switches or buttons external to the housing.

1 18. A lithium battery powered LED light in accordance with claim 1 wherein the LED is
2 electrically connected to an electronic circuit board that includes the voltage converter and
3 current regulator circuit.

1 19. A lithium battery powered LED light in accordance with claim 18 wherein the
2 electronic circuit board is a one-sided circuit board and the lithium battery is located on a
3 side of the circuit board opposite of where the LED is located, the circuit board further
4 comprising a passage

5 constructed and arranged to allow a wire connected to the LED to pass through the
6 passage in the circuit board to a connection that is in contact with the battery.

1 20. A lithium battery powered LED light in accordance with claim 1 wherein the voltage
2 converter and current regulator circuit is constructed and arranged to provide a minimum of
3 2.7 volts to the Gallium Nitride LED.

21. A lithium battery powered LED light in accordance with claim 1 wherein the Gallium Nitride LED is a 1-watt LED and the Lithium battery is a 3-volt lithium battery, and wherein the voltage converter and current regulator circuit is constructed and arranged to power the 1-watt Gallium Nitride LED using the 3-volt lithium battery.

22. A lithium battery powered LED light in accordance with claim 20 wherein the voltage converter and current regulator circuit is constructed and arranged to allow the 3-volt lithium battery to provide at least six hours of continual light from the 1-watt LED.

23. A lithium battery powered LED light in accordance with claim 1 wherein the voltage converter and current regulator circuit further comprises:

- an inductor electrically connected to the switch;
- a Schottky type diode including an anode side and a cathode side, the anode side electrically connected to the inductor;
- a current sensing resistor electrically connected to the LED;
- an output capacitor electrically connected to the cathode side of the Schottky type diode;
- a switching transistor electrically connected to the anode side of the Schottky type diode; and
- a voltage converter and current regulator controller IC including a voltage sense port electrically connected to the inductor, a current sensing port electrically connected to the current sensing resistor, and a transistor driving port electrically connected to the switching transistor.